Educational technical models of neoclassical Edinburgh stonework

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AHSS

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For the Study and Protection of Scottish Architecture

Greetings from the National Office

We hope you will enjoy reading the articles and reports contained in this issue of the magazine. As ever, we hope to present a picture of the sector in these challenging times, as well as share the activities of our Groups and Cases Panels. We're pleased to welcome Craig Stirrat, who recently joined BEFS as Director – he shares his thoughts in this issue's 'Talking Point'. A familiar face in a new role, Elizabeth McCrone, the new Head of Listing at Historic Scotland, introduces us to her Favourite Building(s)'.

We've been busy as ever, and our HQ, the Glasite Meeting House, has been just as lively! It has recently played host to two very different art exhibitions: the first installation was by Thomas Aitchison, Tim LeBreuilly and Stephen Murray of the Sunbear Gallery, as part of 'The Annuale', an art festival coordinated by the Embassy Gallery. The second exhibition took place during the Festival, and was a site-specific exhibition in the McWilliam Room by Ingrid Bell and Jane Murray called 'Kale and the Looking Glass' (see the photo below). The McWilliam Room has also been rehearsal space for a theatre company performing in this year's Fringe Festival (Hamlet! The Musical – the jolliest sounding rendition of Hamlet we've ever encountered). Also in this issue, Peter Burman, Director of the Glasite Meeting House Trust, shares the latest news from the Trustees regarding the future of the Glasite Meeting House.

We all hope you find the magazine interesting and inspiring!

All best wishes
CARMEN MORAN & MARY TURNER

Jane Murray, 'Kale and the Looking Glass', 18-21 August, The Glasite Meeting House

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CALL FOR CONTRIBUTIONS

If you would like to contribute to future issues of AHSS magazine, please contact the editor at **nationaloffice@ahss.org.uk**
Submission deadline for the Spring 2010 issue is **17 February 2011**.

If you are interested in volunteering as a copy-editor for future issues of the AHSS magazine, please contact the AHSS National Office.

Educational Technical Models of Neoclassical Edinburgh Stonework

Architecture students from the University of Edinburgh have been studying the construction and detailing of ashlar neoclassic architectural elements in Edinburgh, as part of a supervised research project for their architectural placement, in collaboration with the City of Edinburgh Council and Historic Scotland. The students first studied an entire façade (Leith Citadel Station), and then a chimney stack and a stone window surround, representing the typical features of this ashlar masonry. Scale models were produced that showcase good conservation practice to non-specialist masons, home owners and architects. The relationship between academy and professional practice provided an opportunity for the students to develop knowledge of the fabric of historic architecture and is expected to further inform teaching and research projects in the construction and performance of historic buildings.

DIMITRIS THEODOSSOPOULOS
Lecturer in Architectural Technology
University of Edinburgh

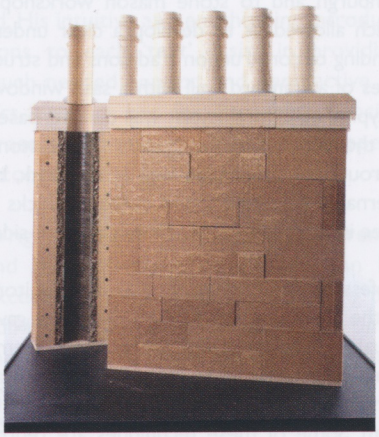
Chimneystack Model

This project started with site visits exploring specific architectural elements that were highlighted for study by Edinburgh Council due to the associated correct construction practices that are required to repair and retain the character of the building, and more importantly, Edinburgh's architectural identity. Eventually, these building studies revealed the importance of the chimneystack within Edinburgh's built environment, and were essential in understanding the numerous technical problems and the character of neo-classical buildings. The iconography of the chimney that is integral to the city's skyline led to exploration of this particular masonry element in model form.

Investigation into modelling techniques revealed the full potential of the model. Our architectural background was integral to the aesthetic qualities of the model, providing a further aspect to the masonry nature of the project. The character of the stone was created through the use of the laser cutter, texturising the surface of the wood and replicating the tectonic qualities of stone.

The completed model is fully demountable, consisting of approximately sixty individual blocks, revealing important details within the chimney such as the flue liners or connections as it is assembled or dismantled. Held together by three hundred small magnets embedded into key points throughout the model, the polarity of the magnets guides the user to reconstruct the model accurately. The educational purpose of the model is achieved through the deconstructive nature of the model.

The detailing is technically accurate in the literal construction of the model, giving the user a realistic understanding of structural qualities in chimney stack conservation. Two flue lining techniques are represented in order to convey a full understanding of modern repairs, while common practice is also shown through the introduction of stainless steel metal ties.



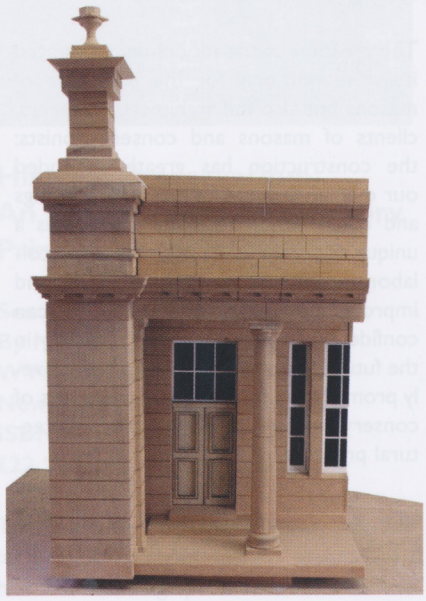
These elements relate directly to the teaching qualities of the model and the desire to inform both home owners and professionals alike in ashlar stone repairs, along with simultaneously furthering our knowledge of conservation and stonework in Edinburgh and diversifying our architectural training.

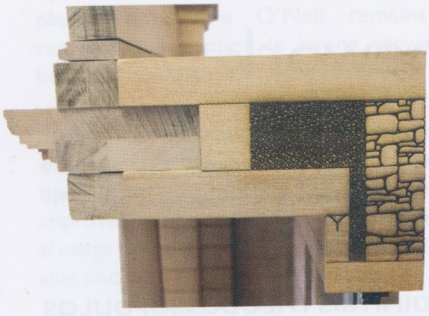
ADAM NEEP, EMMA GARLAND AND LEE KYNOCH,
MA Design

Leith Citadel Station Façade

The outcome of the exercise was a scaled 1:10 interactive model. Made of hardwood, it reproduced the geometry and assembly of key elements of the building, such as the entablature and column. It was designed to be durable and simple to use in teaching circumstances. The deconstructable design of the model has enabled it to be used as a training tool for masons, demonstrating correct restoration methods, and providing masonry students with a more interactive and realistic method of learning. The model incorporates removable elements showing stone construction, joints and fixings. There was an attempt to communicate past construction techniques and building methods used in masonry buildings of this period.

It was essential for the modelling to combine construction information from Historic Scotland and the Council, and historical records (National Monuments Record) with a detailed survey of the façade. This data informed us how Leith





Citadel Station was constructed and designed, and gave us a greater overall understanding of the building.

The University Architecture Workshop was the base for the construction of the model. The woodworking techniques and details to connect the elements were chosen so that the model emulates the practice of a real stonemason, and techniques and load bearing methods applied in real practice. The lower part was modelled as a solid and to represent the stone courses, a lasercutting machine was used, where fine black lines are scored onto the wood, at a much smaller and more accurate scale than could be done by hand. The top section (cornice and parapets) can be completely dismantled and the blocks are held together by dowels representing the real connections.

The creation of the model demonstrated its value not only for the education of masons but also for architects, engineers, clients of masons and conservationists: the construction has greatly extended our own knowledge of masonry buildings and conservation techniques and was a unique opportunity to study masonry, collaborate with large organisations and improve model-making abilities. We can confidently make use of this learning in the future and such projects can effectively promote the progress and awareness of conservation issues within the architectural profession.

SHONA BLACK AND LAURA BARR
MA Design

Stone Window Surround Model

This model shows the stone surround frame of a typical sash window at the scale of 1:10 with the necessary construction and repair details. Similarly to the previous projects, it will be used as a training tool to highlight the structural arrangement of the stonework in support of the window opening and the effect of alterations and repairs to non-specialist masons.

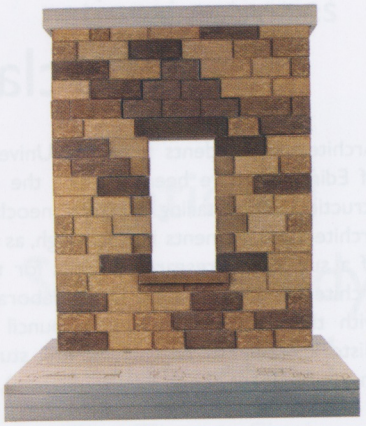
The dimension and details of the model were drawn based on research in conservation literature, visits to restoration sites around Edinburgh and to stone mason workshops, which allowed us to develop a clear understanding of construction traditions and structures of a standard wall with a sash window. A typical structural layout was defined, based on the bonding of the rybatts of the stone surround to the rubble wall at the back, by alternating the inband and outband blocks – three inbands and four outbands on each side.

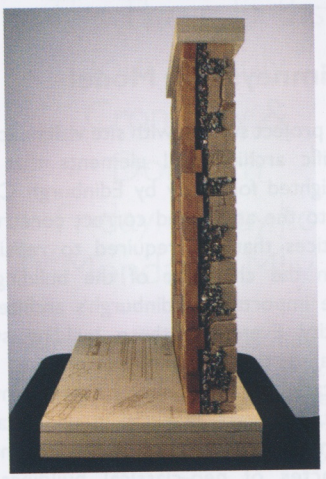
Professional input from the Quality Monitors of the Conservation Department also gave valuable insights in the technical problems commonly encountered in window restoration projects and the best methods to rectify them. Some of these techniques are reproduced for the model, for example partial replacement of inband stone blocks using metal ties; full replacement of inband stone on the opposite side, where surrounding stones have to be taken out; and lintel replacement using drop-dowels, where the stones on top also have to be taken out in order to remove the old lintel.

The stone blocks were modelled in MDF and were varnished. Stone pebbles and resin were used to model the rubble wall, while metal pins and magnets were used for the metal ties and dowels mentioned earlier. It was important to model the fabric around the lintel and the cills in order to study the stability of the surrounding masonry.

Like the previous two models, this model is fully demountable so that it can be used as a tool for teaching and demonstrations. Elements, such as individual stones, can be removed to show how they relate to each other in terms of connection and stability. The process of taking apart and remounting the model is simple and clearly illustrated in the instruction diagram attached so anyone can do it easily and learn from it.

The deconstructible nature of the model not only helps by showing even inexperienced people (such as home owners) the make-up





of a sash window and its surrounding wall, but also demonstrates the vital, but often ignored, structural relationship between the different components. For example, taking away the rubble wall at the back (inner leaf) will make the front face (outer leaf) unstable, bulge and fall; removing the inband stones will compromise the bond between the inner and outer leaf, therefore the outer (ashlar) leaf may collapse or deform and lose its sharp finish.

The appearance of the model is designed to look as realistic as possible; a laser cutter was used to engrave the fine tooled finish of the ashlar stonework, like chisel or point finishing. A different raster image was used to texture the doved finish given to the lintel, cill, inband and outband stones surrounding the window, as usually happens in real life. Different speed and power settings on the laser produced a variety of tones reflecting the typically patchy effect of buildings in Edinburgh. As architecture students, we hope the model not only clearly displays the correct structural composition of a traditional stone frame in Edinburgh, but also captures some of its architectural qualities so that it improves its appreciation by architects and public alike.

MELINDA JIN, LYNNE MACKAY AND WEIFENG KONG,
MA Design